

Katayoon DEHESH *et al.*
Appl. No. 09/591,279

4. (Twice Amended) An amino acid sequence of an engineered β -Ketoacyl-acyl carrier protein synthase II protein wherein said amino acid sequence of said engineered β -Ketoacyl-acyl carrier protein synthase II protein has at least one substitution, insertion or deletion of at least one amino acid residue at a position corresponding to residue 111, 114, 133, 134, 138, 162, 193, or 197 of SEQ ID NO: 47, and wherein said engineered β -Ketoacyl-acyl carrier protein synthase II protein has an altered substrate specificity compared to an enzyme having the amino acid sequence of SEQ ID NO: 47.

5. (Twice Amended) The amino acid sequence of claim 4, wherein said β -Ketoacyl-acyl carrier protein synthase II protein is obtained from a prokaryotic source.

6. (Twice Amended) The amino acid sequence of claim 4, wherein said β -Ketoacyl-acyl carrier protein synthase II protein is obtained from *Escherichia coli*.

7. (Twice Amended) The amino acid sequence of claim 4, wherein said β -Ketoacyl-acyl carrier protein synthase II protein is obtained from a plant source.

28. (New) The amino acid sequence of claim 4, wherein the specificity of said engineered β -Ketoacyl-acyl carrier protein synthase II protein is altered such that long chain fatty acid accumulation is increased compared to an enzyme having the amino acid sequence of SEQ ID NO: 47.

29. (New) The amino acid sequence of claim 28, wherein the specificity of said engineered β -Ketoacyl-acyl carrier protein synthase II protein is altered such that long chain fatty acid accumulation is decreased compared to an enzyme having the amino acid sequence of SEQ ID NO: 47.

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30. (New) An amino acid sequence of an engineered β -Ketoacyl-acyl carrier protein synthase II protein wherein said amino acid sequence of said engineered β -Ketoacyl-acyl carrier protein synthase II protein has at least one substitution, insertion or deletion of at least one amino acid, and wherein said engineered β -Ketoacyl-acyl carrier protein synthase II protein preferentially catalyzes the formation of fatty acids having a shorter chain length than fatty acids catalyzed by an enzyme having the amino acid sequence of SEQ ID NO: 47.

31. (New) The amino acid sequence of claim 30, wherein said β -Ketoacyl-acyl carrier protein synthase II protein is obtained from a prokaryotic source.

32. (New) The amino acid sequence of claim 30, wherein said β -Ketoacyl-acyl carrier protein synthase II protein is obtained from *Escherichia coli*.

33. (New) The amino acid sequence of claim 30, wherein said β -Ketoacyl-acyl carrier protein synthase II protein is obtained from a plant source.

34. (New) The amino acid sequence of claim 30, wherein the specificity of said engineered β -Ketoacyl-acyl carrier protein synthase II protein is altered such that long chain fatty acid accumulation is decreased compared to an enzyme having the amino acid sequence of SEQ ID NO: 47.

35. (New) The amino acid sequence of claim 30, wherein said engineered β -Ketoacyl-acyl carrier protein synthase II protein has an isoleucine to leucine mutation in the amino acid corresponding to amino acid 108 of SEQ ID NO: 47.

36. (New) The amino acid sequence of claim 30, wherein said engineered β -Ketoacyl-acyl carrier protein synthase II protein has an isoleucine to phenylalanine mutation in the amino acid corresponding to amino acid 108 of SEQ ID NO: 47.

37. (New) The amino acid sequence of claim 30, wherein said engineered β -Ketoacyl-acyl carrier protein synthase II protein has an alanine to isoleucine mutation in the amino acid corresponding to amino acid 193 of SEQ ID NO: 47.